CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.07/SS/CSR-12/1034c/CEMENT/2015-16 Date: 01.01.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
*NAME OF THE WORK	:	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	31.12.2015
PERIOD OF TESTING	:	31.12.2015 to 01.01.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	170 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	495 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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****

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Quality Manager

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T-2377

Job No.: CTCE/BBMP/W.No.07/SS/CSR-12/1034c/SAND-Gradation/2015-16 : 01.01.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	: **Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
* Name of Work	: Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Technical Reference	: IS : 2386 Part 1 - 1963 RA-2007
Sample ID	: Fine Aggregates
Sample Received on	: 31.12.2015
Date of Testing	: 01.01.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Spec.Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	93.20	90-100	90-100	90-100	95-100
2.36	77.10	60-95	75-100	85-100	95-100
1.18	58.50	30-70	55-90	75-100	90-100
600 Micron	39.20	15-34	35-59	60-79	80-100
300 Micron	13.30	5-20	8-30	12-40	15-50
150 Micron	2.80	0-10	0-10	0-10	0-15

AE-7

* Information is furnished by the Customer/Representative

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Remarks : This sample is under Zone-II specific limits.

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Job No.: CTCE/BBMP/W.No.07/SS/CSR-12/1034c/AGG/GR/2015-16 : 01.01.2016

TEST REPORT ON COARSE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	: **Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
* Name of Work	: Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Technical Reference	: IS : 2386 Part 1 -1963 RA-2007
Sample ID	: Coarse Aggregates (40mm)
Sample Received on	: 31.12.2015
Date of Testing	: 01.01.2016

Total Wt. of Aggregates in gms= **7000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Spec.Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	96.33	95-100	85-100
20	34.53	30-70	0-20
10	13.80	10-35	0-5
4.75	1.63	0-5	-

AE-1

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits.

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Job No.: CTCE/BBMP/W.No.07/SS /STEEL/2015-16 01.01.2016

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
Name of the Work	:	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Date of Test	:	01.01.2016
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	10	0.62	515	558	13.20	O.K	O.K

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T-2377

Job No.: CTCE/BBMP/W.No.07/SS/CSR-12/1034c/CUBE/2015-16 01.02.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	: **Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
* Name of the work	: Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
* Sample ID	: Drain Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
* Grade of Concrete	: M_{20}
Compressive Strength as on	: 28^{th} day
Sample Received on	: 01.02.2016

AE-7

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	04.01.2016	01.02.2016	8.136	475.6	21.14
2	04.01.2016	01.02.2016	8.248	515.4	22.91
3	04.01.2016	01.02.2016	8.367	493.2	21.92

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Job No.: CTCE/BBMP/W.No.07/SS/CSR-12/1034c/CUBE/2015-16 01.02.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* **Customer**	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* **Agency**	: **Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
* **Name of the work**	: Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
* **Sample ID**	: Drain Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
* **Grade of Concrete**	: M_{20}
Compressive Strength as on	: 28^{th} day
Sample Received on	: 01.02.2016

AE-7

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	04.01.2016	01.02.2016	8.261	482.4	21.44
2	04.01.2016	01.02.2016	8.349	498.6	22.16
3	04.01.2016	01.02.2016	8.427	513.5	22.82

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Job No.: CTCE/BBMP/W.No.07/SS/WMM/Gradation/2015-16 05.01.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr. Sambashiva,**
04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.

Name of Work : Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015

Date of Testing : 05.01.2016

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): **7545**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	245	245	3.2	96.8	95-100
22.4	2285	2530	33.5	66.5	60-80
11.2	1235	3765	49.9	50.1	40-60
4.75	1090	4855	64.3	35.7	25-40
2.36	875	5730	75.9	24.1	15-30
0.600	810	6540	86.7	13.3	8-22
0.075	625	7165	95.0	5.0	0-8

AE-1

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Job No.: CTCE/BBMP/W.No.07/SS/WMM/Gradation/2015-16 06.01.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr. Sambashiva,**
04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.

Name of Work : Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015

Date of Testing : 06.01.2016

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): **7965**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	325	325	4.1	95.9	95-100
22.4	2815	3140	39.4	60.6	60-80
11.2	1255	4395	55.2	44.8	40-60
4.75	945	5340	67.0	33.0	25-40
2.36	870	6210	78.0	22.0	15-30
0.600	760	6970	87.5	12.5	8-22
0.075	605	7575	95.1	4.9	0-8

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Job No.: CTCE/BBMP/W.No.07/SS/WMM/Gradation/2015-16 07.01.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

Agency : **Mr. Sambashiva,**
04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.

Name of Work : Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015

Date of Testing : 07.01.2016

Material : WMM

Sample ID : WMM Layer Oven Dry Wt (gm): **7470**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	340	340	4.6	95.4	95-100
22.4	2345	2685	35.9	64.1	60-80
11.2	1315	4000	53.5	46.5	40-60
4.75	1115	5115	68.5	31.5	25-40
2.36	895	6010	80.5	19.5	15-30
0.600	675	6685	89.5	10.5	8-22
0.075	515	7200	96.4	3.6	0-8

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Job No.: CTCE/BBMP/W.No.07/SS/WMM/AIV/2015-16 05.01.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
Name of the Work	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Sample ID	WMM Layer
Type of Mix	Wet Mix macadam
Date of Testing	05.01.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	384	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	81	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines	21.32	22.14	
	100* (W_2/W_1)%			21.73

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.07/SS/WMM/S-T/2015-16 05.01.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
Name of Work	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Sample ID	WMM Layer
Date of Testing	05.01.2016

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Result : Flakiness Index = **11.62%**

Elongation Index = **13.45%**

AE-7

Result : Combined Flakiness & Elongation index **25.07%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.07/SS/SDBC/AIV/2015-16 08.02.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
Name of the Work	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	08.02.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	377	379	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	298	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.69	21.37	**21.03**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.07/SS/SDBC/Shape_T/2015-16 08.02.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
Name of Work	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	08.02.2016

Result : Flakiness Index = **11.39%**

Elongation Index = **13.52%**

Result : Combined Flakiness & Elongation index **24.91%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.07/SS/SDBC/Stripping/2015-16 08.02.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
Name of the work	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	08.02.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.7	2.90	97.10
2	2.9		
3	3.1		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

Note:

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Þ The results indicated above are based on the tests carried out on the samples received in the laboratory

Þ Any Query regarding the report must be reported within 30 days from the date of testing.

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Job No.: CTCE/BBMP/W.No.07/SS/Sp_Wa/2015-16 08.02.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
Name of the Work	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	08.02.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2014	2015	2017	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1259	1260	1262	
4	Weight of saturated surface dry aggregate in air	W_3 g	2008	2011	2014	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	749	751	752	
6	Weight of oven dried aggregate	W_4 g	1999	2000	2001	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.669	2.663	2.661	2.664
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.701	2.703	2.708	2.704
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.45%	0.55%	0.65%	0.55%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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b No.: CTCE/BBMP/W.No.07/SS/SDBC/Bitumen/2015-16 08.02.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

LIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
GENCY	**Mr. Sambashiva,** # 04, 2nd Floor, 3rd Main, Chamundeswari Layout, Vidyaranyapura, Bangalore - 97.
AME OF THE WORK	Improvements to roads and drains and asphalting in Nagappa and Subbarayappa Badavane Ward No. 07, Byatarayanapura, BBMP, Bangalore.
EFERENCE	EE/BTP/BBMP/E-PMT/254/2014-15 Dated: 02.02.2015
AMPLE I/D	Roads in Nagappa and Subbarayappa Badavane Ward No. 07
ATE OF TESTING	08.02.2016

ITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
Weight of Mixture before Test, g	500	500
Weight of Mixture after Test, g	474	475
Weight of Asphalt and Mineral matter Extracted, g	-	-
Weight of Mineral Matter, g.	-	-
Weight of Ash, g		
Weight of Bitumen Extracted, g. (corrected)	26	25.00
Bitumen content in %	5.20	5.00
Average	**5.10**	

RADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	25.32	5.34	5.34	94.66	90-100
4.75	245.92	51.88	57.22	42.78	35-51
2.36	52.57	11.09	68.31	31.69	24-39
1.18	48.49	10.23	78.54	21.46	15-30
0.3	39.63	8.36	86.91	13.09	9-19
0.075	35.78	7.55	94.45	5.55	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	26.52	5.30	5.30	94.70	90-100
4.75	244.95	48.99	54.29	45.71	35-51
2.36	88.62	17.72	72.02	27.98	24-39
1.18	43.78	8.76	80.77	19.23	15-30
0.3	27.16	5.43	86.21	13.79	9-19
0.075	45.49	9.10	95.30	4.70	3-8

ote:

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